Measuring Children's Height and Weight

Last Reviewed March 2006

Definition: Obtaining height/stature and weight measurement values is the most practical method available for assessing children's growth. These values can be plotted on a CDC U.S. 2000 growth chart/grid for comparison with other children of the same age and gender (U.S. reference population). This comparison enables providers to identify children who are at risk of or overweight, underweight, and below-average height. Growth charts can be used to evaluate a child's individual growth pattern; also to screen large groups of children to determine prevalence of overweight, underweight, and short stature.

Body Mass Index (BMI) is a commonly accepted index for classifying adiposity. Depending on whether pounds and inches or kilograms and meters have been used, it can be calculated as:

$$\left[\frac{\textit{weight in pounds/height in inches}}{\textit{height in inches}}\right] \textit{ X 703 = BMI}$$

$$\left[\frac{\textit{weight in kg/height in meters}}{\textit{height in meters}}\right] \textit{ = BMI}$$

BMI is considered a screening tool and not a definitive measure for overweight. Some athletes and other physically active students may have a high BMI due to increased muscle mass.

Calculating BMI

There are several methods to calculate BMI.

- BMI Wheel
- BMI Calculator
- CDC growth charts for boys and girls to plot BMI can be found at http://www.cdc.gov/nchs/about/major/nhanes/growthcharts/clinical_charts.htm
- Maine Individuals Student Health Records include boy and girl CDC growth charts
- BMI percentile calculator for age - http://www.kidsnutrition.org/bodycomp/bmiz2.html
- BMI percent calculator for PDA (palm pilots) – www.statcoder.com

Who should be screened?

- All school-entry physical exam records should include height and weight.

- Height and weight measurements are recommended at grades K, 1, 3, 5, and 7 with grades 9 and 11 screened as able.

School Nurse Responsibility:

- To accurately assess and classify a student's growth status, it is essential to follow standard, appropriate procedures for obtaining height and weight values.
- Scales should be checked for accuracy (calibrated) with standard weights at least annually.
- Parents should be informed of the intent to screen students with an opportunity to excuse their children from the screening. Information can be provided in Student Handbooks, newsletter, school web site, parent meetings, letters, etc.
- Students must be weighed and measured in a setting that provides for **privacy and confidentiality***.
- All height and weight measurements should be plotted on a growth chart that is maintained with the student's health record.
- Students who are taking medication which could affect their height or weight should be screened routinely.
- Students at risk of overweight or underweight should be screened routinely.
- Encourage students to comply with 5-2-1-0 (5 fruits and vegetables per day, 2 hours or less of screen time, 1 hour of physical activity and 0 sodas or sweetened drinks.)

Equipment:

Weight

Use a properly calibrated balance beam or electronic/digital scale to weigh children and adolescents. The scale should have the following qualities:

- Weights in 0.1 kg (100 gm) or 1/4 lb increments
- Has a stable weighing platform that can be easily set at zero
- Can be calibrated through professional service or by standard known weight.

Height

A portable or wall-mounted stadiometer should be used. The tool should:

- Measure in 0.1 cm or 1/8 inch increments.
- Be stable with a large base.
- Have a horizontal headpiece at least 3 inches wide that can be brought into contact with the most superior part of the head.
- Do not use cloth tapes, yardsticks, or graphics attached to wall.
- Do not use metal measuring rod attached to a scale.

Weight Measuring Procedures

- Scale is set at zero reading.
- Scale is set on firm surface, preferably uncarpeted floor. Student removes shoes and heavy outer clothing such as sweater, jacket, vest and empties pockets.
- Student steps on center of the platform, with back toward the scale, both feet on platform, and stands still.
- Read weight value to nearest ¼ pound or 0.1 (1/10) kilogram
- Student **should not be provided with the results** of the screening*.
- Record weight immediately on data form before child gets off scale
- If using a balance beam scale, return weights to zero position before subsequent student is weighed.

Height Measuring Procedure

- Student removes shoes.
- Student removes hair ornaments, buns, braids to extent possible.
- Student stands on footplate portion with back against stadiometer rule (cut out feet can be placed in position to assist the student).
- Bring legs together, contact at some point (whatever touches first).
- Knees not bent, arms at sides, shoulders relaxed, feet flat on the floor.
- Back of body touches/has contact with stadiometer at some point.
- Body in straight line (mid-axillary line parallel to stadiometer) *(fig1).*
- Head in appropriate position – check Frankfort plane *(fig 2).*
- Lower headpiece snugly to crown of head with sufficient pressure to press hair. Read value at eye level.
- Measure to nearest 0.1 (1/10) cm or 1/8 inch (repeat measurements should agree within .1 cm or ¼ inch.)
- Record value immediately on data form.

Criteria for Referral:

Using the 2000 CDC growth charts, at risk of overweight for ages 2 to 20 years is defined as a Body Mass Index (BMI)-for-age between the 85th and the 95th percentiles. Overweight in children is defined as a BMI-for-age at or above the 95th percentile on the charts. Underweight in children is defined as a BMI-for-age below the 5^{th} percentile.

It is recommended that students with BMI screening results in the 'overweight' category, (= or >95%) be referred to their physician.

It is recommended that students within the BMI 'at risk' category (85^{th} – 94^{th} percentile), with a recent (1 year) increase in BMI percentile be referred to their physician. It is also recommended that students within the underweight category (= or $<5^{th}$ percentile) with a recent decrease in BMI, be referred to their physician.

* These activities are intended to avoid student stigma and harassment.

Resources:

- CDC website to obtain clinical growth charts and training materials: http://www.cdc.gov/growthcharts/
- Nutrition handouts/information on School Health Manual, nutrition section- http://www.maine.gov/education/sh/contents.htm
- BMI calculations for PDA's http://www.statcoder.com/
- BMI percentile for age calculations- http://www.kidsnutrition.org/bodycomp/bmiz2.html
- Arkansas Center for Health Improvement http://www.achi.net/current_initiatives/obesity.asp
- Maine Physical Activity and Nutrition Plan
- Maine CDC Overweight and Obesity - http://www.cdc.gov/nccdphp/dnpa/obesity/index.html

Figure1 ***Position of body for height measurement.***
Figure2 ***Position of head for height management.***

Figure #1: ***The Mid-Axillary Line***
While taking height measurements, make sure that the mid-auxiliary line is parallel to the measuring rod.

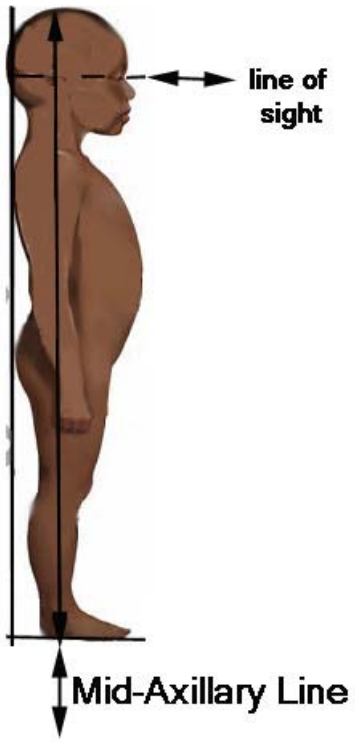

Figure #2

Position of Head
“Frankfort Plane”